REMARKS

The applicant's attorney acknowledges with thanks the courtesy the Examiner extended to Messrs. Daage, Dvorak, Koveal and Marin during the November 18, 2003 interview. The substance of the interview is discussed herein.

Claim 13 has been amended to clarify that the hydrocarbon content is reduced from the catalyst. Support for this can be found in the specification on page 11, lines 25-26.

Claim Rejections-35 U.S.C. §102(b)

The Examiner rejected claims 34 and 35 under 35 U.S.C. §102(b) as anticipated by Nay et al. (USP 5,728,918). The Examiner stated that Nay discloses a regenerated cobalt catalyst used in the Fischer-Tropsch reaction and that the claims are unpatentable because the catalyst of the present invention is the same catalyst as in Nay, despite being made by a different process.

It is well known in the art that the method of preparation or regeneration of a catalyst directly affects the properties of the catalyst. These properties include activity, selectivity, pore volume and surface area among others. The case at issue is no exception. Nay claims regenerating a supported cobalt catalyst by first contacting with an oxygen-containing gas at 200-600°C, followed by contacting with carbon monoxide that is substantially free of hydrogen at 200-350°C to obtain a regenerated catalyst. The present invention, on the other hand, teaches washing a spent catalyst to remove existing hydrocarbons from the catalyst, impregnating the catalyst with a solution of ammonium salts, ammonium alkyl salts, or weak organic acids, followed by oxidation in the presence of the solution and finally reducing in the presence of hydrogen.

The regeneration process of Nay and the present invention are significantly different and, consequently, produce significantly different catalyst products. This can be more readily seen in the accompanying declaration, which includes a chart showing the activation of a deactivated catalyst according to both the present invention (Ex. 8, 9 and 17) and Nay (Ex. 2 and 4). As illustrated, each step in the processes shows that the state of the catalyst metal differs from step to step, thus producing vastly different final products. More significantly, though, the chart shows that the CO consumption, which is one of the most important functions of a catalyst, is substantially higher in the present invention (1826, 1994 and 2029 gms/hr/liter catalyst) than Nay (302 and 368 gms/hr/liter catalyst). This clearly shows that the catalyst products of Nay and the present invention are, indeed, very different. Therefore the 35 U.S.C. §102(b) rejection should be withdrawn.

Claim Rejections-35 U.S.C. §103(a)

The Examiner rejected claims 1-39 of the present invention under 35 U.S.C. §103(a) as being obvious in view of Lapidus et al. (USP 6,331,574 B1) combined with Geerlings (USP 6,130,184) and further combined with Nay et al. (USP 5,728,918). To establish a *prima facie* case of obviousness, all of the claim limitations must be taught or suggested by the prior art. *In re Rayko,* 440 F.2d 981, 180 USPQ 580 (CCPA 1970). Furthermore, a teaching away from the invention in the prior art is evidence of non-obviousness. For reasons detailed below, applicants submit that the art cited by the Examiner fails to teach all of the claim limitations of the present invention and that the prior art teaches away from the present invention.

The Examiner stated in his rejection that Lapidus teaches impregnating the catalyst with a poly- or multidentate ligand compound, such as ammonium containing salts. Applicant's respectfully point out that Lapidus does not, in fact, teach impregnating with a weak acid; rather, Lapidus teaches treating with a chelating compound in order to remove, or leach, the catalyst metal. (See col. 5, lines 32-47). Leaching is not equivalent to impregnating, as leaching, defined by Kirk-Othmer Encyclopedia of Chemical Technology, refers to removing an unwanted component from a solid phase with a liquid phase, while impregnating means to saturate a solid with a liquid or gas. What Lapidus teaches, then, is essentially removing catalyst metal with the chelating agent by leaching, while the present invention teaches to saturate the catalyst with a weak organic acid. Clearly, these are not equivalent elements. Additionally, Lapidus' teaching of removal of metal from a catalyst is teaching away from the present invention because the present invention teaches to *add* metal to the catalyst (see claim 1, step b; claim 13 step c) without dispersing the existing metal. Lapidus seeks to remove the metal to essentially unclog the catalyst pores. This is not the objective in the present invention.

Furthermore, the Examiner stated that Lapidus teaches oxidizing the catalyst after "impregnation". Lapidus does not disclose such a step. Lapidus teaches "... in the preparation of a fresh catalyst ..." (Col. 4, line 2, emphasis added) that (1) the support is impregnating with the catalytic metal salt (Col. 4, lines 4 to 65) and then (2) the impregnated support is oxidized (Col. 5, lines 17-22)[1]. However, when dealing with an inactive catalyst Lapidus states "an inactive or deactivated catalyst ... is (4) activated by contact, and treatment with a chelating compound ..." (Col. 5, lines 28 to 31) and that "(5) The catalyst ... after

[1] See also Example 1 where a catalyst is prepared by impregnating a support, drying and then calcining.

extracting with the chelating agent is reduced ..." (Col. 6, lines 39 to 40). Thus, the oxidation step with respect to a fresh catalyst is not taught or suggested with respect to the spent catalyst.

The difference between Lapidus and applicants' catalyst processing steps provides significantly different results. Again, applicants refer the Examiner's attention to the accompanying chart to show the differences between Lapidus and the present invention. Example 1 of Lapidus shows the preparation of a fresh catalyst, while example 2 shows regenerating a deactivated catalyst according to Lapidus. It is seen here more clearly that there is no oxidation step after leaching with the ammonium salt. Further, Lapidus shows a CO consumption with his regenerated catalyst of 30 gms/hr/liter, whereas the present invention shows 1826, 1994 and 2029 gms/hr/liter catalyst, respectively. This difference is truly remarkable.

The Examiner stated that the present claims differ from Lapidus by reciting that the hydrocarbon content is decreased in the catalyst. The Examiner cited Geerlings, and asserted that the initial hydrogenation reduces the hydrocarbon content of the catalyst, and therefore it would have been obvious to decrease the hydrocarbon content of the present invention by reducing as taught in the first step of Geerlings. There are several discrepancies in this argument.

First, there is no hydrocarbon on or in the catalyst of Geerlings prior to reduction. Moreover, Geerlings step teaches *reduction*, not hydrocarbon removal, and there is no suggestion that Geerlings reduction step could be used to remove hydrocarbons from a deactivated catalyst. Therefore, because there is no suggestion to remove hydrocarbons in Geerlings, the first step of the present invention is not taught in Geerlings.

The Examiner also cited Nay as teaching the passivating step of the dependent claims in the present invention. However, Nay teaches high temperature (200-350°C) treatment of the catalyst. Nay explains that the carbon monoxide reduces a majority of the cobalt present to cobalt metal (col. 2, lines 3-10). This can only occur if the carbon monoxide is significantly reacted as a result of contact with the catalyst. This is in direct opposition to the teaching of claim 11 of the present invention.

Based on the reasons stated above, the references, alone or in combination, do not teach all of the limitations of the present invention. Furthermore, there is no suggestion or teaching in the cited references to modify the references to achieve the present invention. Therefore, the claims are patentable over the prior art, and the applicants' respectfully request that the rejection under 35 U.S.C. §103(a) be withdrawn.

Double Patenting

The Examiner provisionally rejected claims 1-39 under the doctrine of obviousness-type double patenting as being unpatentable over the claims of copending application nos. 10/059,916, 10/059,928, 10/059,918, 10/059,917 and 10/059,926. Terminal disclaimers have been filed herewith, thus obviating the rejection.

Applicants believe that the claims are patentable and that this application is in condition for allowance and such favorable action is respectfully requested. If any questions or issues

remain, the resolution of which the Examiner feels would be advanced by a conference, he is invited to contact Applicants' attorney at the telephone number noted below.

Respectfully submitted,

Mark D. Marin
Attorney for Applicants
Registration No. 50,842
Telephone Number: (908) 730-3271
Facsimile Number: (908) 730-3649

[X] Pursuant to 37 CFR 1.34(a)

ExxonMobil Research and Engineering Company
P. O. Box 900
Annandale, New Jersey 08801-0900